STATE LIBRARY OF PENNSYLVANIA
3 0144 00502970 7

Special Duty Manual for Fire Watchers

PY
D313.2
S741f
c.1

STATE LIBRARY
OF PENNSYLVANIA
17 45

PY D313.2 S741f c.1
Fels Institute of Local and
State Government.

SPECIAL DUTY MANUAL

FOR

# FIRE WATCHERS

## U. S. CITIZENS DEFENSE CORPS OF PENNSYLVANIA

Prepared by the

**Institute of Local and State Government**
**University of Pennsylvania**

For the

## STATE COUNCIL OF DEFENSE
## Commonwealth of Pennsylvania

HARRISBURG, PA.

PENNSYLVANIA STATE LIBRARY
DOCUMENTS SECTION

## STATE COUNCIL OF DEFENSE OF PENNSYLVANIA

GOVERNOR ARTHUR H. JAMES, *Chairman*

SAMUEL S. LEWIS, *Lieutenant Governor*

G. HAROLD WAGNER, *State Treasurer*

F. CLAIR ROSS, *Auditor General*

WM. S. LIVENGOOD, JR., *Secretary, Internal Affairs*

EDWARD MARTIN, *Adjutant General*

CHARLES H. EALY, *President Pro Tem. Senate*

ELMER J. KILROY, *Speaker of the House*

MRS. WM. J. CLOTHIER

WEBSTER NEWTON JONES

LEO A. ACHTERMAN

---

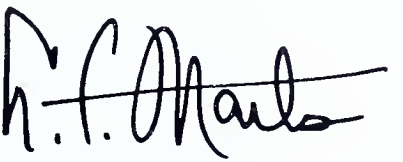
A. C. MARTS
*Executive Director*

A. BOYD HAMILTON
*Secretary*

# FIRE WATCHERS

You are in the front line of civilian protection. Widespread destruction of our cities by incendiary bomb attacks is probably the greatest single threat to our defenses. The experiences of other countries have taught us that the surest guarantee against such catastrophies is to organize great numbers of civilians to control incendiary bombs as they fall. The brunt of this tremendous undertaking of thwarting the enemy falls upon you fire watchers. It is your job to spot incendiaries when they strike, reach them, and extinguish them before any real damage can be done.

The responsibilities you are assuming are important—and may, indeed, be tremendously important—to the defense of the nation and to the total war effort. It is assumed, therefore, that you will prepare yourself for your job by completing the required basic courses, and taking the special duty training as outlined in this manual. Especial emphasis should be placed upon the practice exercises and air raid drills without which the Citizens' Defense Corps cannot reach the high degree of efficiency which the job demands.



A. C. MARTS,
*Executive Director.*

August, 1942.

## PROCEDURE FOR AWARD

## OF

## FIRST CLASS RATING

The following procedure will be followed in granting First Class Rating to fire watchers.

1. Special Duty Training Instructors will report to the County Director of Civilian Defense Schools, via the Chairman of the Local Defense Council and the Chairman of the County Defense Council, the names and addresses of fire watchers who have completed the training.

2. The Chief of Air Raid Warden Service in the Control Center will report to the County Director of Civilian Defense Schools, via the Chairman of the Local Defense Council and the Chairman of the County Defense Council, the names and addresses of fire watchers who have satisfactorily completed the problems and exercises.

3. The County Director of CD Schools thereupon will authorize the award of the black pyramid, insigne of First Class Rating, to those wardens who have met with the requirements.

CONTENTS


| | Page |
|---|---|
| Procedure for Award of First Class Rating | 2 |
| I. Organization and Command | 5 |
| A. Fire watchers are unit of Air Raid Wardens Service | 5 |
| B. Fire watchers are organized by posts | 5 |
| 1. Post is the operating unit | 5 |
| 2. Number of fire watchers per post varies | 5 |
| 3. Fire watchers work in groups of three | 6 |
| 4. Plants and public buildings have own fire watchers | 7 |
| II. Equipment and Protection | 7 |
| III. Duties of Fire Watchers | 8 |
| A. Preliminary to attack | 8 |
| 1. Training is required | 8 |
| 2. Fire watchers study observation area | 8 |
| 3. Fire watchers advise civilians on fire precautions | 9 |
| B. Duties during air raids | 9 |
| 1. Proceed to station when air raid signal sounds | 9 |
| 2. When bombs fall, spot, reach and extinguish incendiaries and fight fires | 11 |
| IV. Reporting | 11 |
| A. Standard procedure is used | 11 |
| B. Messages are transmitted by telephone, by messenger, or in person | 12 |
| Problems and Exercises | 14 |
| Appendix A—Fire Defense A: Controlling Incendiary Bombs | 16 |
| Appendix B—Abstract of General Course, Gas Defense A, Gas Defense B | 33 |

# LOCAL CIVILIAN PROTECTION ORGANIZATION

Suggested by U. S. Office of Civilian Defense
(Citizens' Defense Corps)

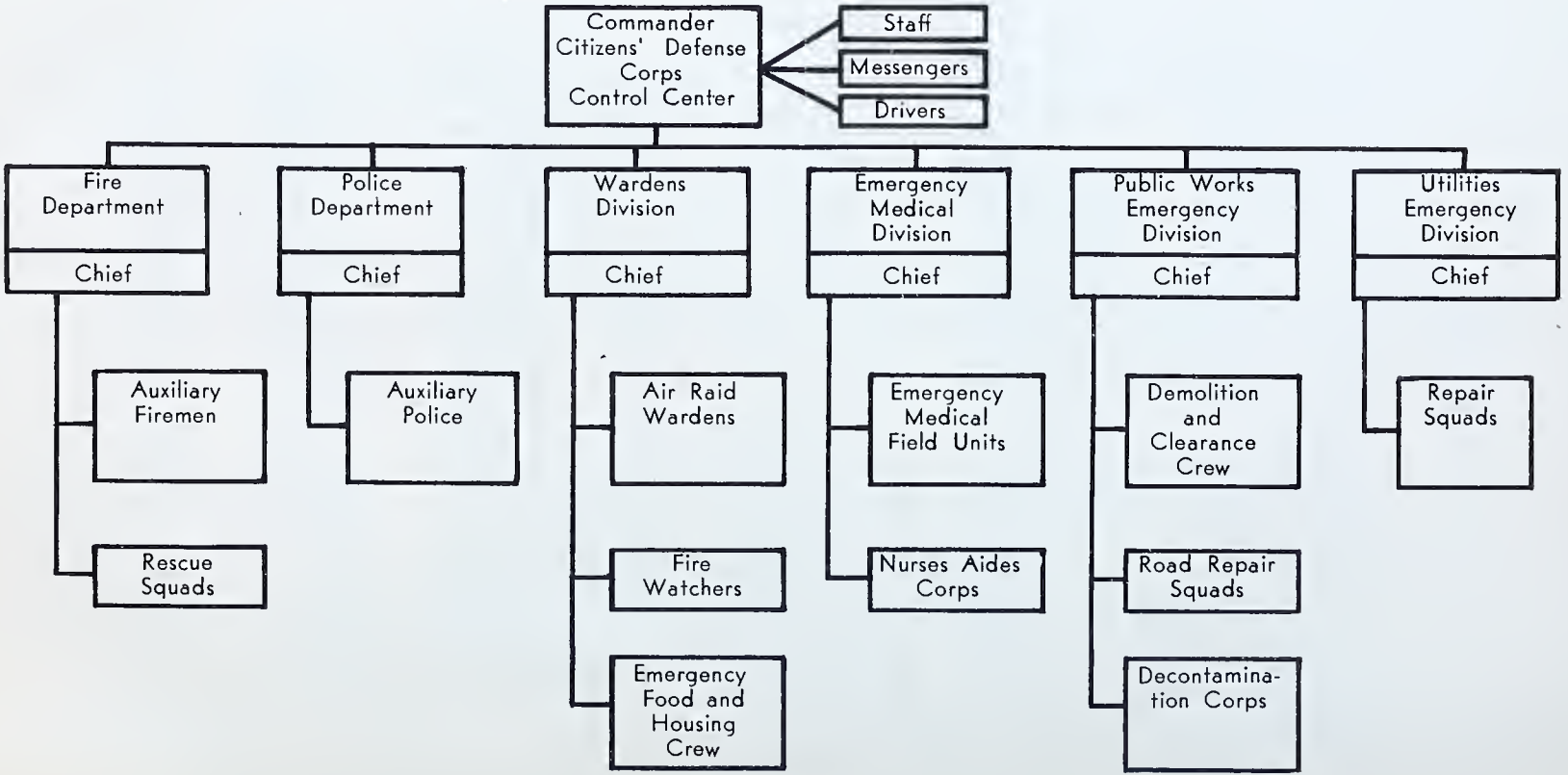



FIGURE 1

# SPECIAL DUTY MANUAL FOR FIRE WATCHERS

## I. ORGANIZATION AND COMMAND

### A. Fire Watchers are Unit of Air Raid Wardens Service

In a local civilian protection organization, as outlined by the U. S. Office of Civilian Defense, the Fire Watchers Service is a unit of the Air Raid Wardens Service. Fire watchers, therefore, come under the command of the Chief Air Raid Warden of the local control center area. Figure 1, which illustrates a civilian protection organization, shows the proper relationship of fire watchers to the Air Raid Wardens Service and other emergency services.

### B. Fire Watchers are Organized by Posts

1. *Post is the operating unit*

   As the post is the operating unit of the Air Raid Wardens Service, so it is of the fire watchers organization. Fire watchers are assigned to wardens' posts and operate under the direct command of the senior post warden. He is responsible for selecting (or recommending to the Chief Air Raid Warden) sites for fire lookouts, for assigning watchers to lookout stations and arranging duty schedules, for arranging for required training, for working out communication techniques and reporting procedures, and for generally supervising the work of fire watchers. He may appoint, with the approval of the Chief Air Raid Warden, a chief fire watcher for the post, to whom he may delegate the detailed direction of fire watcher operations.

2. *Number of fire watchers per post varies*

   Lookout stations are established within each post on roofs, in steeples, and at other high vantage points, where surrounding roof areas can be watched. The number of fire watcher stations needed varies according to the location and character of the neighborhood. Fire watchers are distributed among posts, and each post warden deploys watchers assigned to him, after considering the following pertinent factors. Is the area predominantly residential or commercial? Is it rural or urban? Is it situated close to vulnerable areas or military targets? Is it closely built or are buildings spread out? Are buildings constructed predominantly of flammable materials or of stone and brick? Fire watchers assigned to posts vary from ten to fifty:

   a. Residential districts: Each city block requires one or two lookout stations with three or six fire watchers on duty during emergencies.

   b. Other districts: Larger units are needed in mercantile, industrial, apartment, or tenement districts. Two or three lookout stations with six or nine fire watchers on duty during emergencies are needed for each city block.

Watchers on high places, standpipes, steeples, etc., so that all roof areas can be watched with the fewest posts.

FIGURE 2

3. *Fire watchers work in groups of three*

   a. Fire watchers must spot fire bombs as they fall and combat incendiaries. It is essential that certain fire watchers remain at the lookout stations during attack until relieved. The job of spotting fire bombs is a continuous one requiring constant vigil. At the same time, some fire watchers must be mobile in order to warn and assist occupants of buildings and to snuff out or cover fire bombs which fall in streets and other open areas. Incendiaries burning in the open will illuminate surrounding areas and

serve as beacons to enemy raiders. They must be controlled speedily.

b. Fire watchers will be organized in groups of three: one assigned to the lookout station and two to ground duty. One fire watch unit will be detailed to each lookout station. When incendiaries are dropped or fires break out, the lookout directs the men on the ground to the point of fall. During long drills, alerts, and air raids, several shifts will be required for each lookout station.

4. *Plants and public buildings have own fire watchers*
In addition to regular neighborhood fire watchers, industrial plants, department stores, large apartment and office buildings, etc. may organize fire watcher squads primarily to protect their own property and installations. They operate under the immediate supervision of the building air raid warden, if there is one, or the senior post warden of the post in which the property is located.

## II. EQUIPMENT AND PROTECTION

A. Each fire watcher needs equipment for protection and for use in fighting fire bombs. Personal equipment includes the following: armband (when properly trained and certified), helmet, heavy work gloves, gas mask, goggles, approved flash light, hatchet or axe, report forms.

B. Fire watcher tools are supplied on a loan basis and should be treated with the utmost care. This equipment ordinarily will be distributed by the senior air raid warden of the post. Tools and equipment, other than personal equipment, should be stored at convenient locations throughout the post and at lookout stations where they are properly protected and readily available for use by fire watchers and air raid wardens. Necessary tools include the following (in addition to personal equipment):

1. Pack-type pumps each containing approximately 7½ gallons of water. This pump is easy to carry and large enough to extinguish fire bombs and small fires.
2. Sand-bags for snuffing out incendiaries which fall on roofs, streets, or other open places. Sand-bags are thrown on incendiaries to cut off the glare which may light up the area for enemy raiders.
3. Buckets for carrying water for pumps. Reserve supplies of water may be stored in barrels.
4. Sand in buckets for combatting and removing incendiaries by the sand method.
5. Long-handled shovels or scoops for covering fire bombs with sand and placing them in buckets partly filled with sand for safe removal.

6. Hand-axes or hatchets for use in reaching incendiaries lodged in flooring or wall spaces.
7. Ropes and ladders for use in reaching bombs which land on roofs, or in attics to which there is no other means of access.

C. Adequate provision should be made for protection of fire watchers at lookout stations, since he must remain at his assigned station at all times during an alert or attack. Sand-bags are ordinarily used for protection.

## III. DUTIES OF FIRE WATCHERS

### A. Preliminary to Attack

1. *Training is required*

a. Basic

Ten hours of basic instruction are prescribed by OCD for Fire Watchers:

| | |
|---|---|
| General Course ..... | 5 Hours |
| Fire Defense A ..... | 3 Hours |
| Gas Defense A ..... | 2 Hours |

Basic training is conducted under the direction of the County Director of Civilian Defense Schools. Those who satisfactorily complete their basic training are eligible for appointment by local councils of defense. Only those who have been properly trained, certified, and appointed are permitted to wear the official Citizens Defense Corps armbands.

b. Special Duty

Special duty training for fire watchers, as prescribed by OCD, consists of instruction based on this special duty manual and participation in practical exercises. Special duty training is conducted by the Chief Air Raid Warden or by someone designated by him, under the supervision of the local and County Directors of Civilian Defense Schools. Training in elementary techniques of fire-fighting may be given by instructors from the local fire department or arrangements may be made for fire watchers to attend certain of the classes conducted by the State Fire Organization for auxiliary firemen and rescue squads. Those fire watchers who satisfactorily complete special duty training are eligible for First Class Rating.

2. *Fire watchers study observation area*

The fire watcher, like the air raid warden, must know his area and the people in it. To avoid duplication of effort, it may be possible for fire watchers to assist air raid wardens in surveying the area, preparing inventories of post residents,

and recording accumulated information on maps. Fire watchers should be thoroughly familiar with the information filed in the post headquarters, and should refer to it regularly.

a. Learn all the physical details

(1) Location, type of construction, use, number of occupants, and access doors to attics and roofs of all buildings.

(2) Location of fire hydrants, fire alarm boxes, auxiliary water storage, regular and auxiliary fire stations, reserve supplies of sand and equipment.

(3) Special fire hazards, such as oil storage tanks, filling stations, lumber yards, other highly inflammable materials, fire trap houses.

(4) Location of police stations, wardens post headquarters, first aid stations, and depots of other emergency services.

b. Prepare map

(1) Information accumulated in the survey of the area should be entered on maps which should make clear all facts which you will need to know in an emergency.

(2) Standard map symbols are shown on the following page.

(3) Standard colors are to be used:

Black—for street and building outlines, exits, utility tunnels, post, sector and zone boundaries, streams and rivers.

Red—for special fire hazards.

Blue—for emergency refuge places.

Green—for police stations, first aid stations, other emergency depots.

c. Know your people

Fire watchers should be thoroughly familiar with residents of their areas, noting all persons capable of assisting in fighting fires, emergency workers assigned to the post headquarters, etc.

3. *Fire watchers advise civilians on fire precautions*

Fire watchers assist wardens in instructing and advising residents of the area in proper methods of combatting incendiary bombs. Urge them to obtain necessary equipment and to take immediate precautions. Explain the possibility of water supply being disrupted in air raids. Caution against reliance on organized fire services during air raid emergencies.

## B. Duties During Air Raids

1. *Proceed to station where air raid signal sounds*

a. When the air raid warning signal sounds, fire watchers proceed immediately to their assigned posts. As soon as

Warden's Post

Fire Watcher's Station

Fire Alarm

Telephone

Air Raid Shelter

Gas-Proof Air Raid Shelter

Entrance to Shelter

Fire Station

Decontamination Squad Depot

Repair Squad

Casualty Station

Decontaminating First Aid Station

Bomb Squad Station

Location of Incident (Show number in center)

Demolished Building

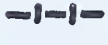
Bomb Crater

Roped-off Area

Street Car Tracks

Double Tracks

Cisterns of Water Reserves

 Sector Limits

Zone Limits

Site of Gas Bomb

Contaminated Area (for large area, blue cross-hatch)

Street Lamp

Fire Hydrant.

Sewer Gratings

Manhole

Tree

Sandbags

they reach their stations, they make a quick survey for incendiaries which may already have fallen. They make certain that their equipment is ready for instant action, then settle down to their vigil, keeping sharp watch at all times for the flare of an igniting fire bomb. Street fire watchers patrol their assigned areas.

b. Fire watchers at elevated fire stations make certain they have proper shelter from bomb splinters. Street watchers take cover in doorways when necessary. Fire watchers remain at their posts throughout bombing attacks or, during a long alert, until relieved.

2. *When bombs fall, spot, reach, and extinguish incendiaries, and fight fires.*

a. If incendiary bombs lodge in nearby buildings, or if fire breaks out in the surrounding area, the fire watcher at the observation station must transmit the necessary directions to the street watchers who warn the occupants of the building and assist in fighting the bomb and resultant fires. The fire watcher who assists at the incident fills out a report form. If the fire gets out of control he immediately reports it to the air raid warden or calls the warden's post headquarters. Wardens transmit calls for assistance to the control center.

b. If incendiaries fall in open areas, the glare must be cut off as quickly as possible. If they fall on roofs through which the molten magnesium may burn, the bucket and loose sand method is recommended. If they fall on streets, in other open areas, or on non-flammable roofs sand bags should be used.

## IV. REPORTING

A. Standard Procedure is Used

1. Incendiary bomb incidents are reported immediately only when fires get out of control and assistance is needed from the control center. In minor incidents which can be handled satisfactorily by householders and fire watchers, reports should be made out and submitted to the senior post warden at the post headquarters immediately following the raid.
2. When an incendiary bomb fire is out of hand and aid is needed, fire watchers report the incident to an air raid warden or, if none is available, to the wardens' post headquarters. Fire watchers are instructed never to call the control center directly. Information which concerns the control center will be reported by the air raid wardens.
3. In all reporting a standard form, similar to the suggested report form in Figure 3, is used.

a. Whether the incident is reported by telephone, in person, or by messenger, all pertinent information should be noted on the report form as soon and as accurately as possible. This will assure accuracy and conserve time in reporting.
b. Messages should be written or printed legibly and only authorized abbreviations used.
c. If unusual difficulty was encountered in extinguishing an incendiary bomb, the bomb should be identified, if possible, or described as accurately as possible and the details of its action reported. It may be a new type of bomb.
d. If it was difficult to reach the roof or attic of certain buildings or houses, fire watchers report in detail. Means may be devised to enable them in the future to keep a closer watch on surrounding properties and to gain easier access in event a bomb falls.
e. If a fire is out of hand and a report must be made, fire watchers indicate under "Remarks" the magnitude of the fire and the danger of its spreading, considering wind direction and construction and closeness of surrounding buildings.
f. Messages should be numbered consecutively beginning with "one."

4. Fire watchers find out, if possible, whether an incident has already been reported by an air raid warden or another fire watcher.
5. When messages are telephoned to the post headquarters, the information should be reported in exactly the same order as called for on the report form. This will conserve time since the message-receiver at the post headquarters must jot down the information on a similar report form. All messages should be written out before they are telephoned. In submitting a message by telephone, the report should begin with the words "Incendiary Bomb Incident," and end with "Report Ends."
6. When messages are given or sent to an air raid warden on duty, they should be written out clearly and completely.

B. Messages are Transmitted by Telephone, by Messenger, or in Person.

1. If an air raid warden is present at the scene of an incident which must be reported to the control center immediately, the report is handed to him. If the incident need not be reported immediately, the report form is filled out and submitted to the senior post warden following the raid.
2. When a warden is not available, the report must be telephoned or dispatched by messenger to the post headquarters. Phones reserved for air raid wardens throughout the post may be used, or, if field telephones are used locally, they will be used in transmitting messages. All telephone numbers that may be required in emergencies should be kept handy.

## FIRE WATCHER'S REPORT FORM

Reporting Agent: ..... Date: .....

Location of Incident: .....

Exact location in building: .....

.....

Damage: .....

.....

Time Incident Occurred: .....M.

Type or description of bomb: .....

.....

.....

Unusual difficulty in extinguishing bomb: .....

.....

.....

Unusual difficulty in reaching bomb: .....

.....

.....

Remarks: .....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Message No. .....

FIGURE 3

## PROBLEMS AND EXERCISES

After completing their basic training, all civilian defense workers are required to participate in practice exercises. These are designed to drill the members of the various corps in their specialized tasks and to build a well-disciplined protection team of all corps. Such practice begins with simple individual problems and progresses to the more complex corps practices, service drills, and combined-group exercises.

Practical problems and exercises limited to the fire watchers corps are directed by the Senior Post Warden for all fire watchers assigned to his post under the general supervision of his superiors in the air raid warden service. Such problems should be as realistic as possible and should be conducted on location. Each fire watcher should be directed to prepare a rough map showing all important features of his area of observation. To test his knowledge of the area, practice can be held at lookout stations with the fire watcher identifying specific locations, streets, buildings, etc., by day and by night. Incendiary bomb incidents can be simulated and fire watchers drilled in the procedure of warning householders and the techniques of reaching and controlling fire bombs.

At the discretion of the Senior Post Warden, he should broaden the scope of fire watcher drills to include air raid wardens and messengers of his post. Practice in communication and reporting of incendiary bomb incidents between fire lookouts and air raid wardens or mobile fire watchers on the street, and between fire watchers and air raid wardens on the post headquarters can best be held by following through simulated incidents.

Satisfactory completion of practice problems and participation in corps exercises are a part of special duty training for Fire Watchers and are required for First Class Rating.

When all corps have attained sufficient competence within their own units to perform jointly with other corps, the Commander of the Citizens' Defense Corps may order combined-group drill involving all corps operating under his command. Problems and simulated incidents are devised in advance. After each such exercise, the Commander and his staff thoroughly analyze the results to make all possible improvements in operation. All service and corps leaders, as well as the members themselves, should take advantage of practice exercises to perfect their performance, both as individuals and as members of the Citizens Defense Corps.

## APPENDICES

A—Fire Defense A: Controlling Incendiary Bombs ..... 16

B—Abstract of General Course, Gas Defense A, Gas Defense B ..... 33

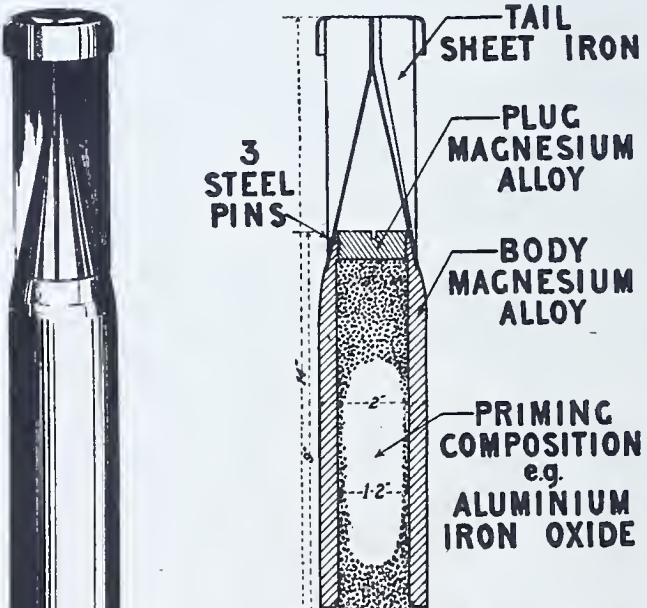
(These are by no means a satisfactory substitute for the detailed material in the *Instruction Manual for Basic Courses*. They are intended to serve merely as quick references for review purposes. Copies of the *Instruction Manual for Basic Courses* are available for persons in supervisory positions.)

## APPENDIX A—CONTROLLING INCENDIARY BOMBS

### MAGNESIUM OR ELECTRON BOMB

A. How to Recognize It.

1. *Small magnesium or electron bomb is most effective and most-used incendiary*
   a. Weighs about 2.2 pounds.
   b. About one in ten magnesium bombs is equipped with a small explosive charge which is added primarily to discourage fire fighters from approaching the burning bombs.
   c. The magnesium bomb has been used extensively by the Germans.
   d. There are also medium and large magnesium bombs, weighing 4.5 to 55 pounds.



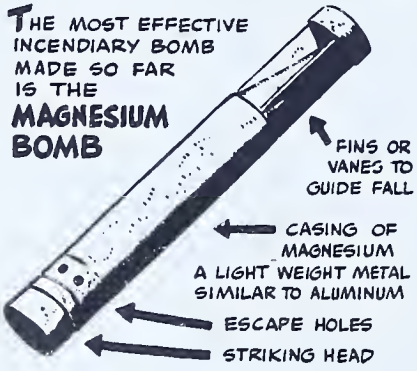

**TYPICAL KILO MAGNESIUM (ELECTRON) INCENDIARY BOMB**

2. *Bomb is shaped like tube*
   a. Case is a thick-walled cylinder of combustible magnesium alloy. It is two inches in diameter and nine inches long. Close to the nose is a ring of vent holes around the cylinder.
   b. Core or filling is a thermit priming composition (aluminum and iron oxide) which is ignited by a "first fire" mixture such as aluminum powder, barium nitrate, and black powder. Unlike thermit bombs, the thermit in magnesium bombs is not the main incendiary material, but is used only to ignite the magnesium.
   c. One end is fitted with a 5-inch sheet iron tail with metal fins to steady the bomb in flight and to cause it to strike on its nose. With fins, the bomb is 14 inches long.
   d. An ignition device located in the nose goes off when the bomb strikes, thus firing the starting mixture and the thermit, which burns with sufficient heat to ignite the casing.

3. *Magnesium bomb burns violently*
   a. Initial stage—1 minute
      (1) The bomb begins to sputter 15 to 20 seconds after impact. During this time it may be possible to throw the bomb into a protective receptacle or out into the open, where it should be covered with sand.
      (2) The thermit burns fiercely for about 50 seconds at the terrific temperature of 4500 degrees Fahrenheit. The heat that is generated is sufficient to ignite the magnesium alloy case.
      (3) Thermit contains its own oxygen (iron oxide) and therefore does not depend upon oxygen from the air.
      (4) The thermit burns with a violent spluttering. Flame shoots from the vent holes and pieces of molten metal are forced through these holes and scatter over a radius of 50 feet.
      (5) About one of every ten bombs contains an explosive charge which usually goes off within two minutes after the bomb strikes. These "discourager bombs," as they are called, cannot be distinguished by their appearance. The individual must take precautions against injury from such possible explosions.
   b. Main stage lasts from 10 to 15 minutes.
      (1) After the initial stage the bomb burns less fiercely.
      (2) The magnesium alloy which has been ignited by the burning thermit burns at a temperature of 2300 degrees Fahrenheit for about 10 to 15 minutes, if not controlled, and gives off a blinding white glare.

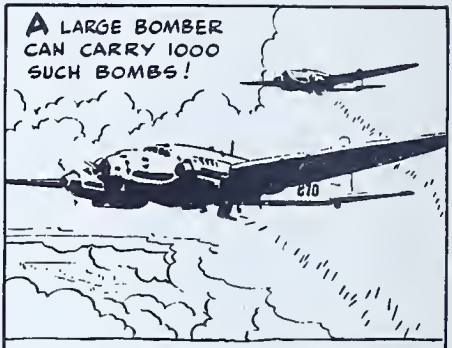
# HOW THE MAGNESIUM BOMB WORKS

THE MOST EFFECTIVE INCENDIARY BOMB MADE SO FAR IS THE **MAGNESIUM BOMB**




LENGTH, ABOUT 14" WEIGHT, 2.2 POUNDS

A LARGE BOMBER CAN CARRY 1000 SUCH BOMBS!



THEY ARE USUALLY RELEASED 20 TO 50 AT A TIME, SPREAD LIKE SHOT BEFORE STRIKING.

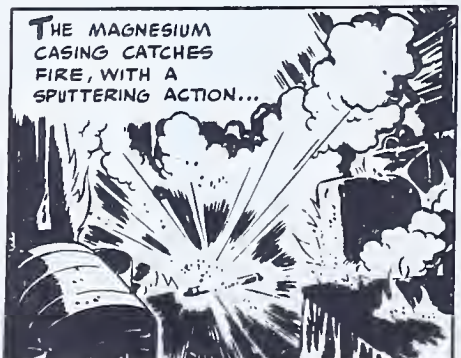
DROPPED FROM A HEIGHT OF 20,000 FEET, THEY DEVELOP ENOUGH FORCE TO PENETRATE AN AVERAGE ROOF...

...THUS, THEY USUALLY START BURNING IN A TOP STORY OR ATTIC

THE THERMITE FILLING OF IRON OXIDE AND FINELY DIVIDED ALUMINUM IS THEN IGNITED AND DEVELOPS A FIERCE HEAT OF **OVER 4500 DEGREES!**

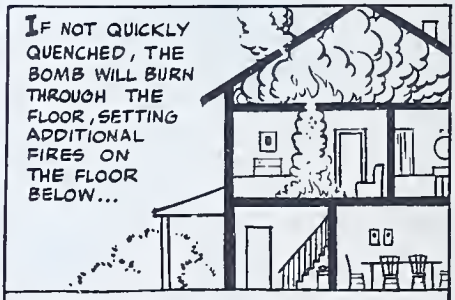
THE FLAME ROARS OUT OF THE ESCAPE HOLES.

THE MAGNESIUM CASING CATCHES FIRE, WITH A SPUTTERING ACTION...



...FLAMING MOLTEN METAL IS THROWN ABOUT AND SURROUNDING INFLAMMABLE MATERIAL CATCHES FIRE

IF NOT QUICKLY QUENCHED, THE BOMB WILL BURN THROUGH THE FLOOR, SETTING ADDITIONAL FIRES ON THE FLOOR BELOW...



**BUT, WITH PROMPT ACTION AND SIMPLE TOOLS, A MAGNESIUM BOMB CAN BE QUENCHED!**

(3) The magnesium, unlike thermit, depends upon a supply of oxygen from the air to continue burning, and the bomb therefore can be controlled during this stage.

4. *Magnesium bomb has limited penetrative power*

a. The small magnesium bomb has purposely been designed to have low powers of penetration. While it will penetrate an ordinary roof (slate, tile, or corrugated iron) if dropped from a height of a mile or more, it is likely to remain in the attic or upper floor. Thus, the fire will be less accessible and the fire fighter will have difficulty in controlling it.

b. If there is a boarded floor immediately below the roof, the bomb probably would not penetrate it, but it might burn through the ceiling and fall into the room below, or molten magnesium might run through cracks in the flooring.

c. When a magnesium bomb has penetrated a building, it becomes immediately necessary:

(1) To control the bomb and prevent it from burning through the floor, and

(2) To subdue and localize the fire resulting from the bomb. No hard and fast rule can be laid down as to which should be dealt with first. The seriousness of fires, the position of the bomb, the equipment available —all affect the choice of action.

B. How to Control It

1. *Jet of water is best method*

a. Water accelerates combustion

(1) After the initial period of violent burning has passed, water may be directed upon the bomb. Water accelerates the burning of the magnesium by supplying it with extra oxygen, and, therefore, causes the bomb to burn itself out quickly. Six to eight gallons of water are needed to consume the bomb and extinguish any normal fire in the room.

(2) Water thrown from a bucket or projected in a solid stream, rather than in a spray, will cause violent spluttering and scattering of the molten metal. If water is applied directly and too fast, the hydrogen and steam which is produced may accumulate faster than it can burn and cause a violent explosion. Extreme caution is, therefore, recommended.

# CONTROLLING WITH WATER

TO FIGHT A BOMB WITH WATER, YOU NEED TWO MEN AND SPECIAL EQUIPMENT. REMEMBER, YOU CAN'T PUT OUT THE BOMB — YOU FEED IT WATER, TO BURN OUT!

ONE MAN PUMPS 80 STROKES A MINUTE TO KEEP A STRONG ENOUGH PRESSURE TO THROW A JET 30 FEET, AS SPRAY, 15 FEET. ONE MAN FIGHTS THE FIRE.

JET ON SURROUNDINGS!

SPECIAL DOUBLE ACTION PUMP WITH 30 FEET OF HOSE AND SPECIAL NOZZLE NEEDED.

YOU USE UP A BUCKET IN 1½ MINUTES

SPRAY ON BOMB

A THIRD PERSON IS MOST USEFUL TO CHECK OTHER POINTS FOR FLAME, REPLENISH WATER AND RELIEVE PUMPER.

AMPLE STORAGE OF WATER SHOULD BE PROVIDED IN ADVANCE, AS WATER MAINS MAY BE BROKEN BY HIGH EXPLOSIVES AND PRESSURE LOST! FILL THE TUB, EXTRA PAILS AND DON'T FORGET IN A PINCH —— THE CONTENTS OF HOT WATER OR HEATING BOILERS!

**NEVER** THROW THE CONTENTS OF A WATER PAIL ON A BOMB!

...IT WILL SCATTER WITH EXPLOSIVE VIOLENCE!

IF CONTROL OF THE BOMB SEEMS DOUBTFUL, HAVE AN ALARM TURNED IN, BUT CONTINUE FIGHTING THE BOMB UNTIL HELP ARRIVES OR SUPPLIES ARE EXHAUSTED!

1 LEARN **NOW** HOW TO CALL

2 LEARN **NOW** LOCATION OF NEAREST ALARM...

MILTON CANIFF

b. Stirrup hand-pump or similar appliance is good control device.

(1) This type of appliance is well recommended for dealing with incendiary bombs and resultant fires.

(a) It enables the operator to fight the fire from a safe distance and away from the intense heat, smoke and glare.

(b) It is economical in water consumption; six to eight gallons usually are sufficient.

(c) It is not dependent on ordinary water supply and pressure, since it is a hand-operated pump, and the necessary water can be drawn in advance.

(2) Construction is well-adapted to the job.

(a) It is fitted with a dual-purpose nozzle which can produce either a spray or an 1/8 inch jet of water, as desired.

(b) It is equipped with 30 feet of hose, thus permitting the pump-operator to be well away from the heat, smoke, and glare while the person at the nozzle advances to attack the bomb and the fire at close range.

(c) The pump itself stands in a bucket which must be kept supplied with water.

(3) Pump needs little care

(a) Normally the pump should require no attention.

(b) When using dirty water, the foot strainer may become choked with debris. This can be removed easily with the fingers.

(c) If the nozzle becomes choked, unscrew it and clear it quickly. If the spray is irregular or one-sided, check the spray openings for obstructions.

(4) One, two, or three persons can handle an incendiary.

(a) Three can do the job most efficiently.
No. 1 man takes charge of the fire fighting and operates the nozzle.
No. 2 man pumps the water from a bucket.
No. 3 man keeps the bucket replenished with water, relieves No. 2 when necessary, and watches for molten metal burning through to the next lower floor. When the ceiling of the next lower story shows discoloration, a bucket of sand is placed directly beneath to catch falling molten magnesium.

(b) When there are only two men available, No. 1 takes the nozzle and No. 2 operates the pump and replenishes the supply of water. This may

interrupt the fire-fighting and prevent obtaining a steady flow of water.

(c) When only one person is available, he takes the pump and one bucket and operates the nozzle from the pumping position.

c. Garden hose is a fair substitute

(1) A simpler means of applying water to an incendiary bomb is an ordinary garden hose attached to the nearest faucet in the house. If the hose is sufficiently long to reach any part of the house, and the municipal water supply is maintained at a sufficient pressure, the garden hose method will serve very well.

(2) Reliance upon garden hoses is not generally recommended. When water is being drawn in large quantities by fire engines from the city mains, household pressure will drop so that a sufficient stream could not be obtained in the upper floors of a house. Also, water mains may be burst by high explosive bombs and the city water supply to the house may fail at a critical time.

d. Both bomb and fire must be controlled.
The normal sequence of action in combatting magnesium bombs and resultant fires by the water method is as follows:

(1) Control the fire first. This will enable the operator to get close enough to the bomb to direct the water upon it.

(2) Direct the stream of water on the bomb until it is consumed, but it may be necessary occasionally to keep the fire under control.

(3) As soon as the bomb has burned itself out, make a thorough search for smouldering fires in unseen places. If necessary, lift floor boards or remove panelling and skirting from the walls.

e. Hose operator should take safety precautions

(1) Wear heavy gloves.

(2) Wear dark or smoked glasses, not colored ones, for protection against spluttering metal and the glare of burning magnesium.

(3) Lie down and keep face close to the floor if smoke makes it difficult to see and breathe.

(4) Use an axe or hatchet to clear away obstacles in the approach to the bomb if necessary.

(5) Use an overturned table, chair or door for protection against flying metal in case the bomb should explode. A wet blanket thrown over the shoulders is some protection against sputtering fragments.

(6) Use a flashlight in making the final search for smouldering fire.

2. *Sand method of control eliminates glare.*

a. Sand decreases intensity of burning

In the sand method of control, no attempt is made to accelerate the burning of the bomb. The bomb is covered with dry sand or similar material to cut off the supply of air upon which magnesium depends for its supply of oxygen. This reduces both the glare and the heat.

b. Use sand outside and when surroundings are not combustible.

(1) Sand should be used indoors only when the bomb has fallen on a surface and in surroundings which are not readily combustible, or when water cannot be used. It is difficult to use sand unless action is taken at once.

(2) Sand should be used out of doors, where the fire danger is slight. It should always be used out of doors at night to prevent the bomb's glare from serving as a guide to raiding planes.

c. Use scoop and bucket to remove bomb

(1) Method

(a) Dump about ¾ of a bucket of dry sand on the floor about six feet from the bomb. If the sand is damp or wet, the magnesium will be fed additional oxygen from the water and burn more violently. Use a long-handled scoop or shovel to place the sand around and on the bomb until the glare and heat are reduced.

(b) Scoop up the bomb and the covering sand and drop into the bucket, which still contains about four inches of sand to prevent the magnesium from burning through. Cover the bomb with the sand remaining on the floor.

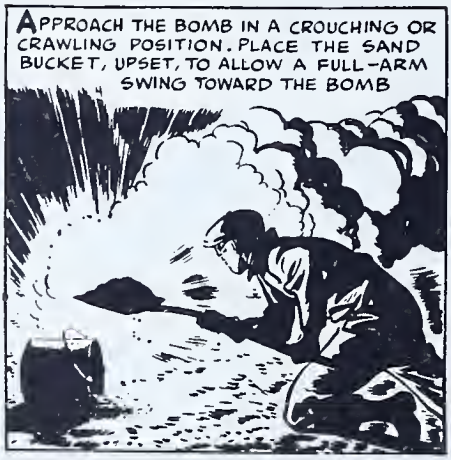
(c) Remove the receptacle, with the bomb in it, to a safe place. Carry the receptacle at the end of the scoop or a pole. While the bomb is being removed, it is desirable that a second person be present to fight the fire caused by the bomb.

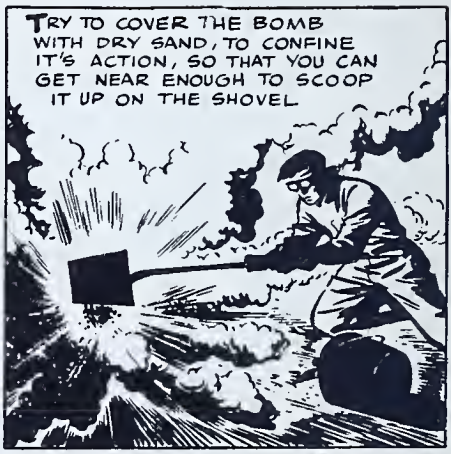
(d) Use an ordinary fire extinguisher or water to put out fire after removal of the bomb.

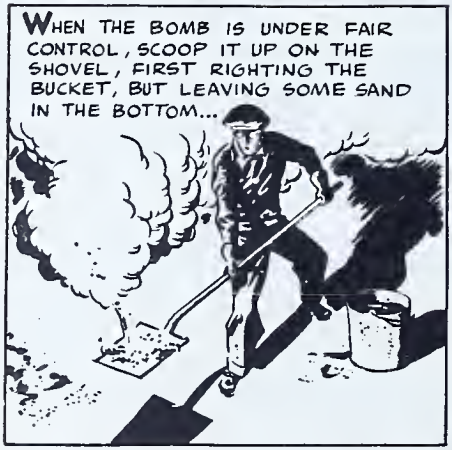
(2) Equipment needed to remove a magnesium bomb.

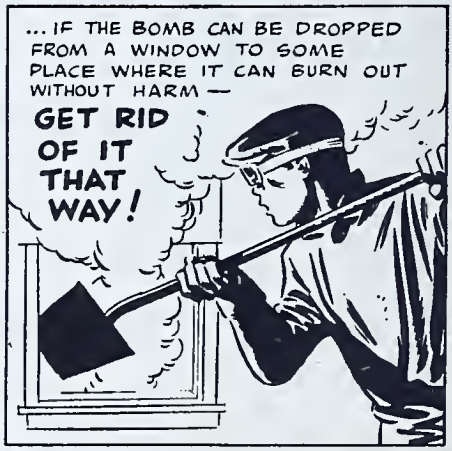
(a) Long-handled scoop or shovel.
(b) Coal scuttle, bucket, or similar receptacle.
(c) At least one bucket of dry sand.
(d) Dark goggles for protection against glare and spluttering particles.

# CONTROLLING WITH SAND


APPROACH THE BOMB IN A CROUCHING OR CRAWLING POSITION. PLACE THE SAND BUCKET, UPSET, TO ALLOW A FULL-ARM SWING TOWARD THE BOMB





WHEN THE BOMB IS UNDER FAIR CONTROL, SCOOP IT UP ON THE SHOVEL, FIRST RIGHTING THE BUCKET, BUT LEAVING SOME SAND IN THE BOTTOM...



3. *Pitch smothers magnesium bombs*

a. Spread pitch over bomb

(1) A hard coal-tar pitch which has a softening point of about 300° Fahrenheit may be used in fighting magnesium bombs. When spread over burning magnesium, the pitch softens and forms an air-tight seal which cuts off the supply of oxygen and smothers the fire. Burning thermit, unlike magnesium, contains its own oxygen and pitch is therefore ineffective against it.

(2) The type of pitch used should pass through six-mesh sieve but should be coarser than 35-mesh. Flake pitch under 35 mesh with fine dust removed may also be used. Pitch is easily available and inexpensive.

(3) The method used in extinguishing bombs with pitch depends upon the type of surface upon which the bomb lies.

(a) Dry ground, concrete, or metal surface
Spread a layer of pitch over the bomb with a long-handled scoop or shovel to guard against flying fragments. Do not throw the pitch at the bomb.

(b) Wood floor
Spread a layer of pitch on the floor near the bomb, roll the bomb on to this layer, and cover it with more pitch. Use a long-handled scoop or shovel.

(4) With this method, the magnesium bomb is completely extinguished and it is not necessary to remove it immediately.

b. Use pitch in public buildings and industrial plants.

(1) The use of pitch is recommended principally for industrial plants, public buildings, and other large structures, where trained fire watchers are employed and where supplies of pitch can be kept at strategic locations. It is not recommended for use in homes and small buildings.

(2) About 25-pound lots of pitch should be held in readiness at various places on the upper floors of plants or buildings.

(3) The necessary equipment should be kept readily available. This includes long-handled scoop or shovel and buckets to hold the pitch.

(4) With this method, the magnesium bomb is completely extinguished and it is not necessary to remove it immediately.

4. *Certain fire extinguishers may be used*
   a. Water-type extinguishers may be used
      (1) All water solution types, including soda acid and plain water extinguishers, may be used. Foam type extinguishers may also be used. Turn the extinguisher upside down to create pressure.
      (2) One extinguisher does not contain enough liquid to burn out a magnesium bomb, and they cannot be refilled quickly. The use of extinguishers, therefore, is not recommended unless enough of them are available.
   b. Never use carbon tetrachloride extinguishers on magnesium bombs.
      If the label indicates that the extinguisher is of the carbon tetrachloride type, do not under any circumstances use it on a magnesium bomb. It not only is ineffective but may generate dangerous gas.

## OIL BOMB

A. How to Recognize It

1. Solid oil enclosed in a huge drum is used in a scatter-type incendiary. Finely divided metallic sodium or potassium or sodium hydride is sometimes added to rekindle the fire by chemical action if the oil comes in contact with water.
2. Liquid oil also is used as a scatter-type incendiary. Large drums of flammable oils fitted with a simple fuse arrangement are used against definite targets of great military importance. The oil is scattered and ignited by a black powder burster charge upon impact. The certainty of ignition and violence of the burning may be increased by diluting the oil with gasoline, turpentine, or other highly flammable liquids. These bombs produce nearly twice as much heat as an equal weight of magnesium alloy.

B. How to Control It

1. Water and fire extinguishers are effective
   Use water or any of the usual types of fire extinguishers. Take care not to spread the burning oil: do not direct a stream of water on it. Spray surroundings with water to restrict the fire.
2. Sand may also be used
   Some oil bomb fires can be effectively extinguished by smothering them with sand.

## MULTIPLE EFFECT BOMB

A. How to Recognize It

1. This is a large bomb, usually 25 pounds or more, consisting of a large number of separate units of phosphorus and magnesium alloy loaded in a single container.

2. The units are scattered widely when the bomb explodes.
3. Used principally for important targets such as refineries and factories.

B. How to Fight It

This bomb is composed of separate units of magnesium alloy and phosphorus. Each type requires a separate treatment.

1. Spray magnesium units with water or cover with sand and remove to a safe place.
2. Extinguish burning phosphorus with water or copper sulphate solution and remove to a safe place, or let the particles burn out while controlling the fire with water.

## WHITE PHOSPHORUS BOMB

A. How to Recognize It

1. This bomb is composed of a charge of white phosphorus and a burster charge in a thin steel container.
2. When exploded the white phosphorus is showered over an area of 50 to 100 square yards, depending on the size of the bomb.
3. The white phosphorus particles ignite spontaneously upon contact with the air and burn for a short time.
4. Phosphorus ordinarily will not set fire to heavy planks or heavy wooden construction but will readily set fire to more flimsy materials such as wood shingle roofs, dry grass, ripe grain, etc.
5. The greater danger from white phosphorus bombs is the serious burns caused when they come in contact with the human body.
6. When white phosphorus burns it produces a heavy white smoke and is commonly used for smoke screens. The smoke is harmless but may produce mild throat irritation and coughing.
7. Japanese use the 33-pound and 132-pound types.

B. How to Fight It

1. *Use copper sulphate solution if available*

   Spray copper sulphate solution on the burning phosphorus particles. This will stop the burning and cause a chemical reaction which results in the formation of a thin coating of metallic copper over the phosphorus particles. Let the particles cool and solidify, remove them to a safe place, and burn them.
2. *Water may be used*

   Phosphorus can be controlled by keeping it constantly wet until it can be removed to a safe place and allowed to burn itself out. As soon as the water evaporates, phosphorus particles re-ignite.

3. *Exercise great care in extinguishing phosphorus bombs* Phosphorus not only causes severe and painful burns when it comes in contact with the body, but also has a poisonous effect on the system. Be certain to remove every particle of burning phosphorus.

## INCENDIARY LEAVES OR "CALLING CARDS"

A. How to Recognize Them

1. These are four-inch moist cards which are treated with a small amount of phosphorus.
2. They burst into flame as the moisture evaporates.
3. Thousands of such cards can be scatttred by a single plane on one raid.
4. They are used particularly to set fire to fields of ripe grain, dry woods, or combustible roofs.

B. How to Fight Them

Immerse them in water or copper sulphate solution or let them burn in a safe place.

## THERMIT BOMB

A. How to Recognize Them

1. The thermit bomb is composed of a thin, metal case filled with thermit (a mixture of aluminum granules and iron oxide).
2. They range in size from 10 to 132 pounds.
3. It is fired with a firing pin on impact, or with a time fuse set to ignite at a predetermined time after release.
4. When ignited, thermit reacts chemically and violently to form a mass of molten iron which ignites flammable material with which it comes into contact. A 10-pound thermit bomb expends itself in about a minute; the larger types take little more time.
5. Thermit does not depend upon a supply of oxygen from the air to support combustion but any continued incendiary action of the molten iron does.
6. Japan and Germany are prepared to use thermit bombs of both 33-pound and 132-pound types.

B. How to Fight It

Little can be done to control the thermit bomb itself. Spray it with water to cool the molten iron and keep the fire under control.

## DUDS AND APPARENT DUDS ARE REMOVED BY BOMB SQUADS

1. Bombs which land without exploding or burning may be delayed-action bombs and may also be highly explosive.

Hence, it is extremely dangerous for unskilled persons to handle them.

2. Vacate the premises immediately and notify the air raid warden. The job of removing an unexploded bomb is a highly specialized job which is done by experts.

## FIRES CAUSED BY INCENDIARIES MUST BE EXTINGUISHED

### A. Observe General Rules for Fire-Fighting

1. Use water for small fires resulting from incendiary bombs. Extinguishers may be used if not sprayed on magnesium or phosphorus bombs.
2. Check all possibilities of fire under the flooring, and seepage of molten metal to floors below. Place a sand-filled receptacle below the spot on the floor on which a magnesium or other bomb is lying. Discoloration of the ceiling will usually indicate that spot.
3. Evacuate the building of all persons not required to assist in fighting the fire.
4. Large fires which may get out of control should be reported to the air raid warden who will summon the fire-fighting forces through the control center. Continue to fight the fire with all available equipment. In emergencies, the fire department cannot be relied on to reach all fires.

### B. Fire Fighting Technique Depends On Type of Burning Materials

| MATERIAL ON FIRE | HOW TO FIGHT IT |
|---|---|
| 1. Wood, textiles, rubbish, etc. (Indoors or outdoors.) | Use water or any type of chemical fire extinguisher. |
| 2. Oils, greases, inflammable liquids, or materials impregnated with such. | Cautiously flood with water to dilute, but not to float away, burning liquids. Chemical fire extinguishers of the vaporizing liquid, foam, and carbon dioxide types may extinguish small fires. Sand may also be used to absorb burning liquid. |
| 3. Household and industrial fires in which electrical equipment is exposed. | Use water or fire extinguishers of foam, vaporizing liquid, or carbon dioxide types, but only if voltage is low or current off. Otherwise, use fire extinguisher of vaporizing liquid type, in which the liquid is a non-conductor. |
| 4. Automobiles, trucks, buses, etc. | Extinguish by chemical fire extinguishers of vaporizing liquid or carbon dioxide type. |

C. Learn Rules for Escape or Rescue from Burning Buildings

If a fire gets out of control the following rules should be followed by those caught in burning buildings or who enter to rescue others.

1. In searching a house for occupants, start at the top and work down.
2. Crawl along floor with head low, to avoid smoke and heat.
3. Close doors and windows to cut off draughts and to reduce the spread of the fire.
4. Do not use burning passages or stairways if rescue can be made through a window.
5. When using stairways or passages for escaping from burning rooms, keep close to the walls where there is greater support for the floor.
6. To escape from a window without the aid of rope, sit on the sill, turn around, lower the body to the full extent of the arms, and drop with the knees bent. Escape from windows in floors above the first should be attempted only as a last resort, unless directed by a fireman.
7. If the door of a burning room opens outward, open it carefully using a foot to prevent a sudden out-swing because of pressure. Open it steadily and use it as a shield; then lie down and crawl into the room.
8. To move an unconscious person from a burning building, lay him on his back and tie his wrists together. Then kneel astride him, but his arms around your neck and crawl. To move the person downstairs, lay him on his back with head toward the stairs. Hold him under the armpits and drag him carefully down the steps.

## ADVANCE PREPARATIONS MINIMIZE DAMAGE

A. Minimum Precautions Are Immediate Need

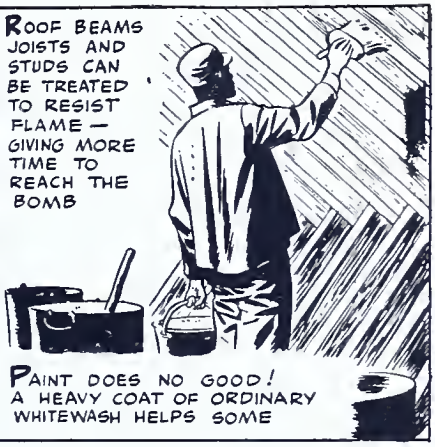
1. Every adult in every family should learn the methods for dealing with bombs and fires. Duties should be allotted to each in advance.
2. Preliminary drill in which each person practices his special duties is essential, especially in large concerns.
3. Appropriate appliances should be obtained before they are required. Supplies of water, and of sand or dry earth should always be on hand.
4. Spaces under the roof, such as attics, in which incendiary bombs are most likely to lodge, should be cleared of combustible material beforehand, and ready access to these places provided.
5. The following equipment should be kept in convenient places in each household for use in the event of incendiary bombing: blanket, sand, longhandled shovel or scoop, buckets, stirrup

# FIRE DEFENSE

IT WILL BE VERY DIFFICULT TO FIGHT A MAGNESIUM BOMB UNLESS SOME WORK IS DONE BEFORE THE ATTACK

ALL FURNITURE TRUNKS AND JUNK OF ALL KINDS SHOULD BE REMOVED FROM ATTIC OR TOP FLOOR!

ROOF BEAMS JOISTS AND STUDS CAN BE TREATED TO RESIST FLAME — GIVING MORE TIME TO REACH THE BOMB



PAINT DOES NO GOOD! A HEAVY COAT OF ORDINARY WHITEWASH HELPS SOME

## FIRE RESISTANT COATING

1½ POUND CHINA CLAY
1½ POUND WATER GLASS (SODIUM SILICATE)

MIX TO A SYRUP
ADD ONE PINT OF WATER
APPLY LIBERALLY

— IF THESE MATERIALS CAN BE OBTAINED, THEY ARE SUPERIOR TO WHITEWASH.

A ¾ INCH PLASTER LAYER ON THE FLOOR OR 3 INCHES OF DRY SAND EARTH OR FURNACE ASHES HELPS...

...IT MAY BE LAID ON IN CLOSELY PACKED SANDBAGS, MORE CONVENIENT AND CLEANER — (IF STRUCTURAL STRENGTH PERMITS)

NEXT, ASSEMBLE YOUR BOMB FIGHTING EQUIPMENT... PUT IT WHERE YOU CAN QUICKLY GET IT ON YOUR WAY TO THE TOP FLOOR OR ATTIC... NOT UP THERE! PRACTICE PICKING IT UP ON THE RUN!

## HERE'S COMPLETE EQUIPMENT:

HEAVY GOGGLES
HEAVY GLOVES
TWO BUCKETS OF DRY SAND

LIGHT WEIGHT LONG-HANDLED SHOVEL
BUCKETS OF WATER (AND EXTRA STORAGE)

A PUMP TANK

FLASHLIGHT

hand-pump or garden hose with necessary attachments, axe or hatchet, heavy gloves, smoked glasses, flashlight and first-aid kit.

6. If air raids are immediately imminent, sand should be kept on the roof and in the house, ready for use. A water barrel should be kept filled on the roof or in the attic, and the bath tub and other containers should be kept full of water.

B. Further Precautions Give Added Security

1. The floors of attics may be covered with a non-inflammable material such as:
   a. Two to two and one-half inches of dry sand, earth, sifted ashes or foamed slag;
   b. A sheet of 20-gauge corrugated iron, insulated from the floor by a thin layer of sand;
   c. Three-quarter inch layer of asbestos boarding.
2. Flat roofs may be covered with a layer of sand bags. The following materials of the specified thicknesses have been found to withstand the impact of a magnesium bomb:
   a. Reinforced concrete, $3\frac{1}{2}$ to 4 inches.
   b. Sand, earth, 6 inches.
   c. Shingle, 6 inches.
   d. Mild steel plate, $\frac{1}{4}$ inch.
3. To reduce fire risk in attics further, the rafters, joists, and other woodwork may be coated with fire-resisting paint or heavy white-wash.
4. Rugs may be taken up and curtains and drapes removed.

# APPENDIX B

# CIVILIAN PROTECTION ORGANIZATION

## CITIZENS' DEFENSE CORPS PROTECTS CIVILIANS

The citizens' defense corps performs the line or action function of civilian protection in air raid emergencies. These service squads are the units operating in the field during air raids to protect civilian life and property.

The basis of civilian protection organization is the existing municipal government. Police, fire, and public works functions are usually assigned to those municipal departments. The emergency medical services may be organized under the Department of Health. Thus the emergency services, except for the Wardens Service, merely supplement or reinforce the regular peace-time municipal functions.

## COMMANDER DIRECTS CIVILIAN PROTECTION OPERATIONS

The commander has full control over the operations of the civilian protection organization during periods of air raid emergency. The chiefs of the emergency services, Fire, Police, Wardens, Medical, Public Works, and Utilities, are subject to his direction.

The operations of air raid wardens and auxiliary service units are coordinated through the control center. Air raid wardens are responsible for calling the control center when there is need for the assistance of service units. The commander, with the aid of his staff and the chiefs of emergency services, dispatches the necessary units and maintains control over their distribution.

## SIXTEEN UNITS COMPRISE CITIZENS' DEFENSE CORPS

Twelve of the sixteen citizens' defense corps units provided for by OCD are organized into six emergency services: Fire, Police, Wardens, Medical, Public Works, and Utilities. In addition, staff workers, messengers, and drivers are assigned to the control center and are at the disposal of the commander. Variations in civilian protection organization exist among Pennsylvania communities. In urban centers, a more or less complete organization is needed and is provided. In smaller communities, maintenance of all 16 corps may not be necessary; in some cases, the functions of several corps units have been or will be consolidated.

The following is an outline of the duties and responsibilities of the various corps.

### 1. Air Raid Warden Service

*Air Raid Wardens.* Observing lights showing during a blackout and warning occupants of buildings; calling attention of law enforcement authorities to failures to comply with blackout rules and regulations, and requesting their cooperation in obtaining such compliance; directing persons in the streets to shelter; reporting to the Control Center any fallen bombs or fire; assisting in fighting incendiary bombs; detecting and reporting to the Control Center the presence of gas; administering elementary first aid; assisting victims in damaged buildings.

*Fire Watchers.* Standing guard on posts in doorways, on roofs and at other vantage points in order to spot, reach and extinguish fallen bombs.

*Emergency Food and Housing Corps.* Providing food and shelter for persons whose homes have been destroyed or damaged by air raid or other disaster; assisting local welfare departments.

### 2. Emergency Fire Service

*Auxiliary Firemen.* Assisting regular fire-fighting forces, including laying hose relays and operating small pumpers under the immediate direction of the local fire chief.

*Rescue Squads.* Rescuing persons trapped in debris; shutting off broken gas, electric and water lines; shoring up, tunneling and minor demolition work; rendering emergency first aid; assisting local public works, fire and other municipal departments.

### 3. Emergency Police Service

*Auxiliary Police.* Enforcing emergency restrictions on lighting and prohibitions on trespassing; guarding of docks, buildings, bridges and factories; performing traffic duty to facilitate movements of essential vehicles; preventing looting of partially demolished buildings, shops and homes; assisting air raid protection services before, during and after a raid; and generally assisting the regular police force under the immediate direction of the local police chief.

### 4. Emergency Medical Service

*Medical Corps.* Proceeding to scene of air raids or other disasters and setting up casualty stations; establishing advance first aid posts; rendering emergency care of the injured; assisting local hospitals and health departments.

*Nurses' Aides Corps.* Assisting nurses in wards and out-patient clinics of hospitals; assisting emergency medical field units in casualty stations and first aid posts.

**5. Emergency Public Works Service**

*Demolition and Clearance Crews.* Removing rubble and debris from streets after air raids; destroying partially demolished or unsafe walls and buildings; filling bomb craters in streets; assisting the local public works department.

*Road Repair Crews.* Repairing roads after air raids to restore normal flow of traffic as rapidly as possible, including smoothing road surfaces, repaving with available material, restoring road markings filling holes and applying top dressing; assisting street departments and public works departments following rough clearance by Demolition and Clearance Crews.

*Decontamination Squads.* Effecting chemical neutralization of streets, walls and buildings contaminated by gases; assisting health department in connection with decontamination work.

**6. Emergency Utilities Service**

*Utility Repair Squads.* Repairing water, gas, electric, telephone, steam and other utility services damaged by air raid or other disaster.

**7. Staff Group**

*Staff Corps.* Serving in an administrative capacity in civilian protective work in the Washington Office or any Regional Office of the Office of Civilian Defense; commanding or directing the local units of the Defense Corps in the protective services engaged in civilian defense; acting as local Bomb Reconnaissance Agents.

*Drivers Corps.* Driving vehicles to assist other units of the Defense Corps.

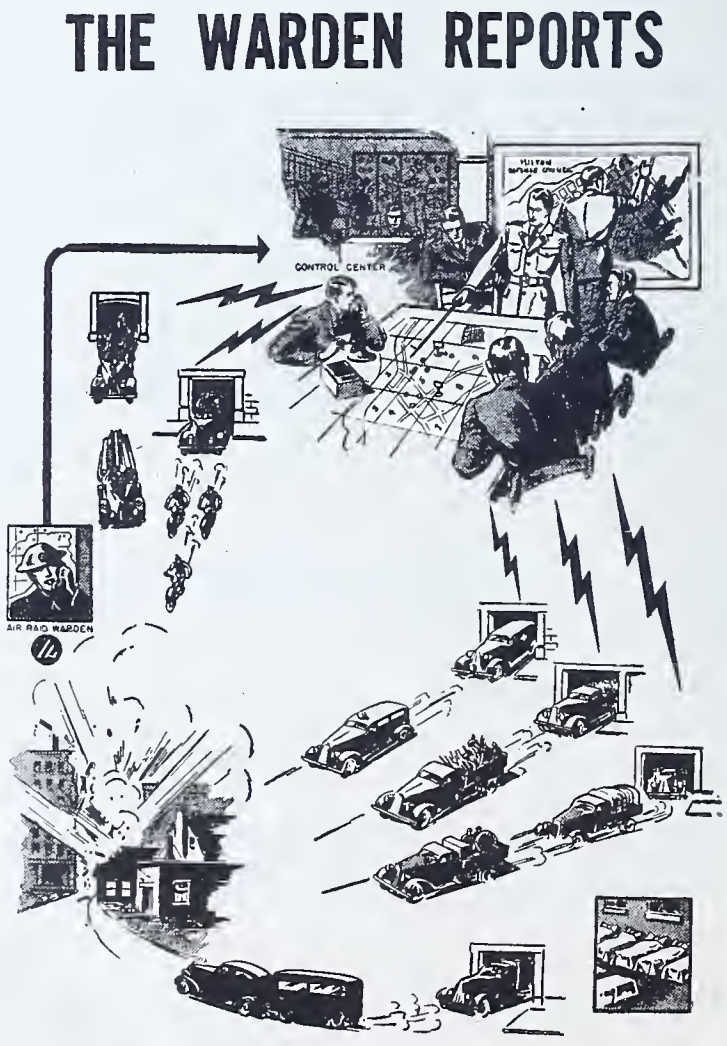
*Messengers Corps.* Performing messenger service for air raid warden posts, control and message centers, hospitals, casualty stations and first aid posts, fire stations and police stations, and other units of the Defense Corps.

## THE CONTROL CENTER

In air raid emergencies the field operations of the Citizens' Defense Corps are directed and coordinated through a system of control centers.

### The "Nerve Center" of Civilian Protection

The control center is the nerve center of civilian protection in action. When air raid incidents occur, messages are immediately dispatched to the control center by the air raid wardens. As the information contained in these reports is assembled and plotted on the control map, the Commander sends his forces into action where needed. Fire forces are dispatched to the fires started by incendiary bombs. Rescue Squads and Medical Units speed to the scene to help the trapped and the

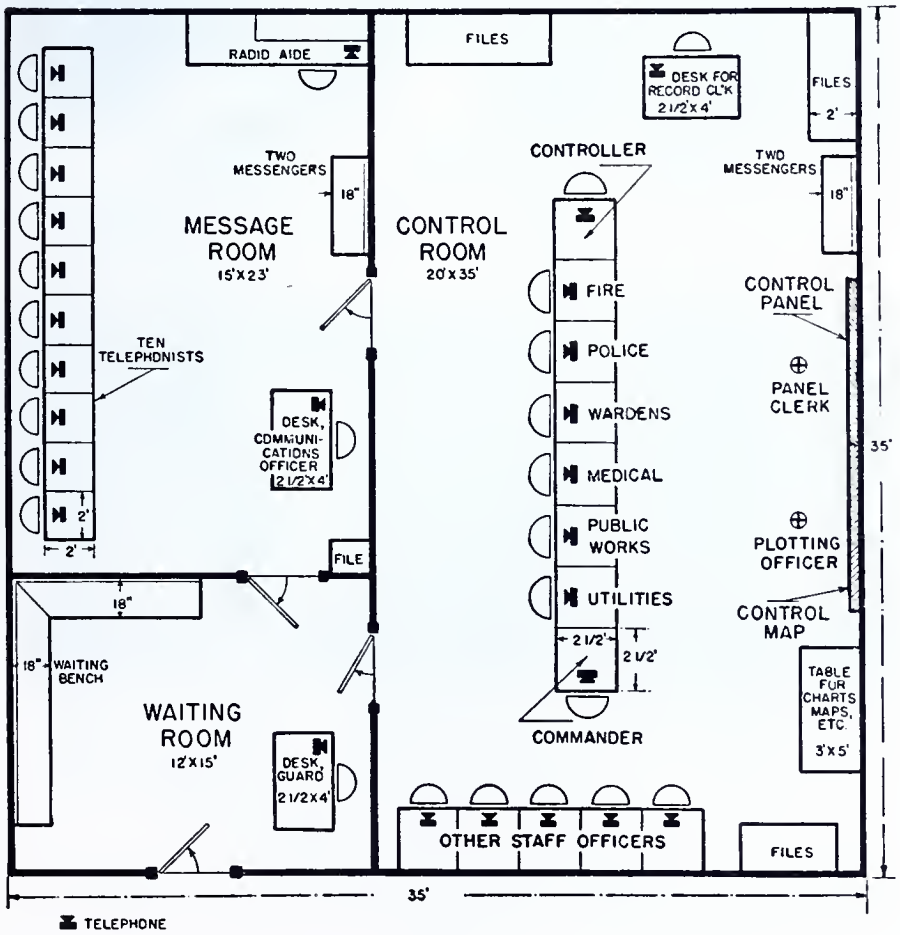


injured. Demolition and Clearance Crews, followed by Road Repair Crews, clear away debris and reopen streets to traffic. Utility repair squads repair broken cables and mains. Meanwhile, the air raid wardens, fire watchers and auxiliary police are operating in the field—aiding civilians, controlling incipient fires, and preventing looting and sabotage.

### Commander and Staff Direct Operations

Assisting the Commander, who is appointed by the relevant council of defense to assume full charge of civilian protection during air raids, is his staff. Seated at the control table are the chiefs of the six emergency services—wardens, fire, police, medical, public works and utilities—who advise the commander on service units available and service units to be dispatched to the scene of incidents. The staff also includes a controller, communications officer, plotting officer, panel clerk, records clerk, messengers and telephonists.

## TYPICAL ROOM LAYOUT OF CONTROL CENTER SERVING A POPULATION OF 100,000



## BLACKOUTS

### Army Orders Blackouts

Blackouts are ordered only by the U. S. Army. Orders for alerts and blackouts in Pennsylvania are issued by the Commanding Officer, 1st Interceptor Command, and are transmitted to civil authorities through the Aircraft Warning Service.

"Blackout" means that lights are extinguished, covered, or shaded to prevent identification of targets and to prevent the use of lighted streets or areas as reference points for locating assigned targets and military objectives.

*DO NOT run when air raid warnings sound after dark during blackouts.*

*Use your flashlight as little as possible, if at all. Never point it upward not at any object that might reflect upward.*

*Know where you want to go and how to get there. Keep to the right.*

*Keep pets on leash if you take them out after dark.*

*If you are hurt, move to the nearest wall and ask the first persons who come along to report your injury to the nearest first aid station.*

*If you are not familiar with the neighborhood, ask someone who is or report to the first policeman or air raid warden.*

BLACKOUT BEHAVIOR

Specific blackout restrictions are determined by the army and civilian defense authorities but the following regulations are generally applicable:

*Street lights* are fitted with low-watt bulbs and covers that diffuse the light horizontally.

*Automobile headlights* are hooded and covered except for a small pair of slits. The officially approved blackout device has not yet been announced.

*Traffic lights* are hooded and covered except for small slits.

*Buildings* must be equipped with opaque coverings for windows and doors. All outside lights and inside lights visible from the outside must be extinguished or properly covered. Paint, heavy curtains, light baffles or screens may be used.

### Householders Black Out Refuge Rooms

Every householder is responsible for preparing at least one room for use during blackouts. All windows and skylights in occupied rooms should be darkened by using blinds, thick drapes, special screens, or even blankets. Lights in other rooms should be extinguished. Lights near outside doors should be screened so that no light is visible when the door is opened.

## AIR RAID WARNING SYSTEM

### Army Detects Enemy Raiders

The air raid warning system is operated by the Military Aircraft Warning Service and the Civilian Air Raid Warning System. The Aircraft Warning Service has been organized by the Combat Command of the U. S. Army Air Forces to detect and report the approach of enemy airplanes, to enable our fighting planes to attack the hostile raiders and to enable the military authorities to warn communities in the path of invading bombers. The Civilian Air Raid Warning System gives warning by messages and signals of the approach of enemy aircraft so that each locality can mobilize its civilian protection forces to meet the challenge.

### Air Raid Information Is Relayed

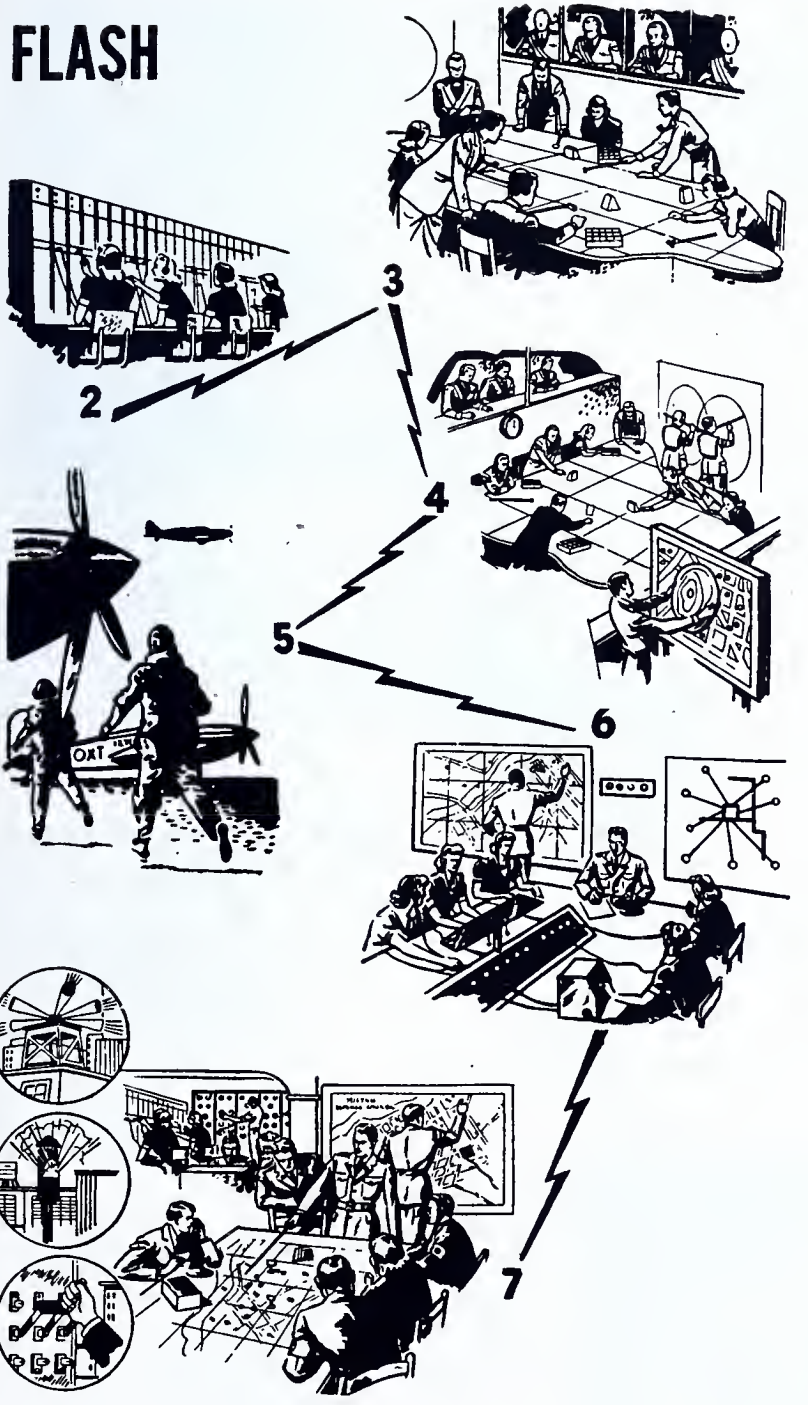
The 1st Interceptor Command area, which includes Pennsylvania, is divided into air defense regions, each with a command post or information center. Air defense regions are subdivided into two or three smaller areas, each with a central communications point known as a filter center. Each filter center area is in turn subdivided into smaller areas, each with an observation post manned by civilian observers. Stationed in the information center is a civilian air raid precautions officer who transmits air raid messages to warning districts threatened by the raiders. The warning district centers in turn relay the signals to the control centers which alert the civilian population when necessary.

When an observer sights a group of hostile planes, he picks up his telephone (1) and says *Army Flash*. The Central Operator (2) at once connects him with the assigned Filter Center (3) to which he reports the type of planes, number, height, and direction of flight. When several reports agree, watchers transmit the data to an Information Center (4) where developments over a large area are plotted on a huge map.

Watching the map, Air Corps officers order interceptor planes into the air, (5) direct them to contact with the enemy; another officer notes the cities threatened and flashes a yellow, blue, or red alarm, according to the degree of danger, to the proper Warning District Center (6).

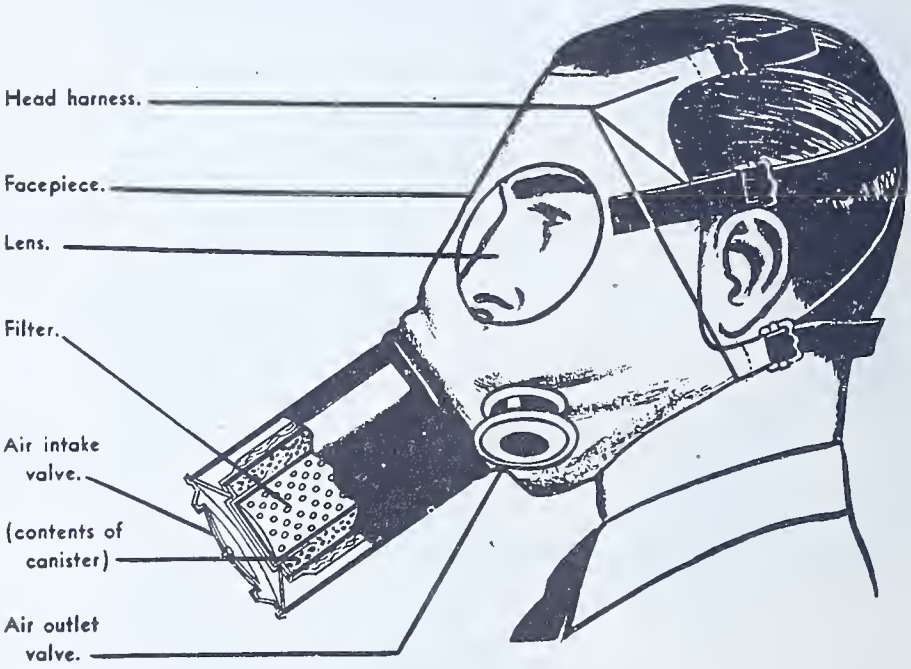
At this point, Civilian Defense takes over from the Air Corps, telephones the warnings to Control Centers (7) within the Warning District. And here the Commander of the local Citizens' Defense Corps orders the alert, has the public warning sounded, usually short blasts on air horns, power horns or steam whistles or on the wailing sirens—and if the bombers arrive overhead, directs the operation of passive defense.

# FLASH



## HOW TO USE A GAS MASK

The civilian gas mask consists of an adjustable, gas-resistant facepiece, fitted with eyepieces and head-harness, and a canister which filters the air.




NONCOMBATANT GAS MASK

### Putting On and Adjusting the Mask

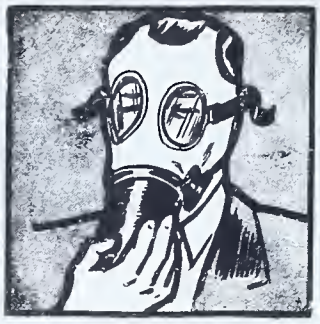
To remove mask from carrier, place left hand around bottom of carrier, and open cover flap with right hand.

Bring mask up in front of face. Grasp facepiece in both hands with thumbs inside and below lower head-harness strap and with fingers on outside of facepiece. Open up mask with thumbs.

Thrust chin up and out. Put mask over chin and then rest of face.

Pull head-harness down on back of head. Brush hair back so mask will rest on face. Adjust mask on face.

Place left hand over outlet valve and exhale, emptying lungs. This forces out any gas inside facepiece. Start breathing normally.



Test for leakage by placing palm over inlet valve and breathing in. Facepiece should collapse on face unless fit is loose or the is leakage.

Removing the Mask

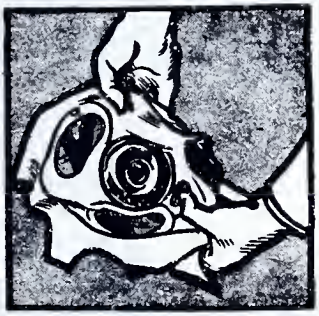
Always test for gas before removing mask. Take full breath, exhale part, then hold breath. Stoop down and forward. Insert 2 fingers between face and facepiece, let air enter. Sniff for gas. If none, remove mask.

Grasp canister just below facepiece. Bend head forward slightly, pull mask outward and upward off head.

Hold mask in right hand and fold headharness inside.

Replace mask in carrier and close flap.

Inspecting the Mask



Examine facepiece carefully for pinholes, cracks, or tears by holding it up to a strong light. Examine chin seam for rips. Stop any leaks with adhesive tape.

Examine head-harness buckles for breakage and straps for tears.

Examine inlet valve. Rubber disk must not stick to valve seat, must retain elasticity. If hardened or cracked, it must be replaced.

Examine outlet valve in same way as inlet valve.

Examine carrier for holes, other signs of wear.

## WAR GASES

At this writing, war gases have not been used against the British or others trained to protect themselves. They have been used against the Ethiopians and the Chinese.

A gas-tight room suitably located offers fair protection against any probable concentration of war gas in a city. For those whose duties take them into the streets a gas mask offers full protection against all but the "blister gases." For protection against mustard or lewisite, full protective clothing is needed.

War gases may be dropped in bombs or simple containers, and liquid vesicants may also be sprayed by airplanes.

The gas warning is a "percussion sound"—that is, bells, drums, hand rattles, rapidly struck resonant objects of any kind. The spreading of an alarm is the responsibility of the wardens.

### Householders Gas-Proof Refuge Room

War gases hug the ground, flow into cellars and basements. Upper floors of a dwelling are usually sufficient protection against dangerous concentrations. If all openings and cracks are closed, a room three stories from the ground will offer good protection against war gases.

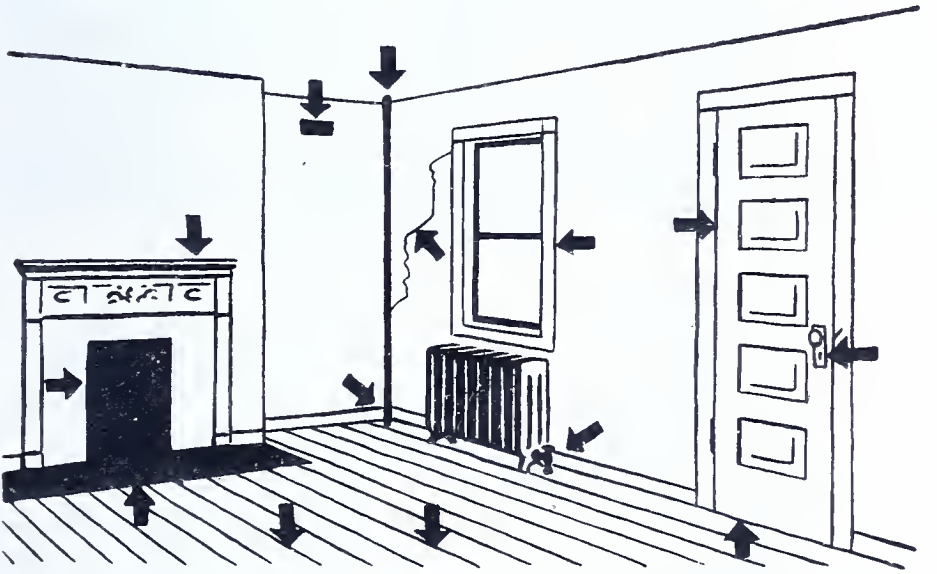
To seal cracks and small openings, tape of various kinds may be used. A pulp made by soaking newspapers in water, or patching plaster may be used for caulking larger openings. Pieces of wall

board, nails and caulking material should be kept handy to cover windows broken by the blasts of high explosives.

One door may be used as an entrance by fastening a blanket over it in such a way as to seal it tightly when no one is going in or out. If soaked in oil to close the air spaces, the blanket is more effective.

The refuge room should contain supplies of food, and water, chairs, a battery-operated radio, a flashlight, and some sort of toilet facilities.

Allow 20 square feet of floor space for each person who is to occupy an average room with a ceiling nine feet high. This will give enough air for ten hours of occupancy.



All crocks and openings should be sealed to gasproof a room. Arrows show where to look for cracks and leaks.

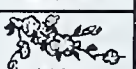
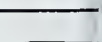
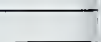
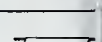
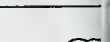
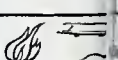
GASPROOFING REFUGE ROOM

# CHEMICAL WARFARE AGENTS

## GENERAL INSTRUCTIONS

The importance of proper first aid for gas victims cannot be overemphasized. The following are general rules which apply in all cases.

A. Act promptly and quietly; be calm.

| CLASS | NAMES AND SYMBOLS | FORM | ODOR | PHYSIOLOGICAL EFFECT | TACTICAL CLA |
|---|---|---|---|---|---|
| VESICANTS | MUSTARD $S(CH_2CH_2)_2Cl_2$ OI-CHLORETHYL SULFIDE | LIQUID AND VAPOR | Garlic, Horseradish, Mustard | Delayed effect. Burns skin or membrane. Inflammation respiratory tract leading to pneumonia. Eye irritation, conjunctivitis. | |
| VESICANTS | LEWISITE $CHClCH\text{-}AsCl_2$ CHLORVINYL-DICHLOARSINE | LIQUID AND VAPOR | Geraniums | Burning or irritation of eyes, nasal passages, respiratory tract, skin. Arsenical poison. | |
| VESICANTS | ETHYLDICHLORARSINE $C_2H_5\text{-}AsCl_2$ | LIQUID AND VAPOR OR GAS | Stinging, like pepper on nose | Causes blisters, sores, paralysis of hands, vomiting. Severe on long exposure. | |
| LUNG IRRITANTS | CHLORINE $Cl_2$ | GAS |  Highly Pungent | Long irritant. | |
| LUNG IRRITANTS | CHLORPICRIN $CCl_3NO_2$ NITROCHLOROFORM | GAS | Flypaper, anise | Causes severe coughing, crying, vomiting. | |
| LUNG IRRITANTS | DIPHOSGENE $ClCOOC\text{-}Cl_3$ TRICHLORMETHYL CHLOROFORMATE | GAS | Ensilage, Acrid | Causes coughing, breathing hurts, eyes water, toxic. | |
| LUNG IRRITANTS | PHOSGENE $COCl_2$ CARBONYL CHLORIDE | GAS | Musty hay, Green corn | Irritation of longs, occasional vomiting, tears in eyes, doped feeling. Occasionally symptoms delayed. Later, collapse, heart failure. | |
| LACRIMATORS | CLORACETOPHENONE $C_6H_5CO\text{-}CH_2Cl$ | GAS |  Apple Blossoms | Makes eyes smart. Shut tightly. Tears flow. Temporary. |  |
| LACRIMATORS | BROMBENZYLCYANIDE $C_6H_5CN\text{-}BrCN$ | GAS | Sour fruit | Eyes smart, shut, tears flow. Effect lasts some time. Headache. |  |
| STERNUTATORS | ADAMSITE $(C_2H_4)_2\text{-}NHAsCl$ DIPHENYLAMINECHLORARSINE | GAS | Coal Smoke | Causes sneezing, sick depressed feeling, headache. | |
| STERNUTATORS | DIPHENYLCHLORARSINE $(C_6H_5)_2\text{-}AsCl$ | SMOKE | Shoe Polish | Causes sick feeling and headache. |  |
| SMOKES | H C MIXTURE $ZN + C_2Cl_6$ | SMOKE | Sharp-Acrid | Harmless. | |
| SMOKES | SULPHUR TRIOXIDE $SO_3 + SO_3HCl$ ia CHLORSULFONIC ACID | SMOKE | Burning matches | Causes prickling of skin, flow of tears. |  |
| SMOKES | TITANIUMTETRACHLORIDE $TiCl_4$ | SMOKE | Acrid | Harmless. | |
| INCENDIARIES | WHITE PHOSPHORUS P | SMOKE | Burning matches | Burning pieces adhere to skin, clothing. |  |
| INCENDIARIES | THERMIT $8Al + 3FeO_4$ | INCENDIARY | None | 5,000 degree heat ignites materials. | |

B. Pot a gas mask on the patient if gas is still present r, if he has a mask on, check to see that his is properly djusted. If a mask is not available, wot a handkerchief r other cloth and have him breathe through it.

C. Keep the patient at absolute rest; loosen clothing o facilitate breathing.

D. Remove the patient to a gas-free place as soon as possible.

E. Summon medical aid promptly; if possible, send the victim to a hospital.

F. Do not permit the patient to smoke, as this causes coughing and, hence, exertion.

| OTECTION | FIRST AID [After removal from gassed area] | PERSISTENCE | FIELD NEUTRALIZATION |
|---|---|---|---|
| | Undress; remove liquid mustard with protective ointment, bleach paste, or kerosene; bathe; wash eyes and nose with soda solution. | One day to one week. Longer if dry or cold. | Cover with unslaked lime and earth. 3% solution of $Na_2SO_3$. |
| | Undress; remove liquid Lewisite with hydrogen peroxide, lye in glycerine, or kerosene; bathe; wash eyes and nose with soda. Rest—Doctor. | One day to one week. Longer if dry or cold. | Wash down with water. Cover with earth. Alcohol. NaOH spray. |
| | Undress; remove liquid with hydrogen peroxide, lye in glycerine, or kerosene; bathe; wash eyes and nose with soda. Rest—Doctor. | One hour. | Cover with earth, caustic, |
| | Remove from gassed area. Keep quiet and warm. Coffee as stimulant. | 10 minutes. | Alkaline solution. |
| | Wash eyes, keep quiet and warm. Do not use bandages. | Open 6 hours. Woods 12 hours. | $NaSO_3$—Sodium sulfite in alcohol solution. |
| | Keep quiet and warm. Give coffee as a stimulant. | 30 minutes. | Alkali. |
| | Keep quiet and warm, bed rest. Coffee as a stimulant. Loosen clothing. No alcohol or cigarettes. | 10 to 30 minutes. | Alkali. |
| | Wash eyes with cold water or boric acid solution. Do not bandage. Face wind. For skin, sodium sulphite solution. | 10 minutes. | Strong, hot solution of sodium carbonate. |
| | Wash eyes with boric acid. Do not bandage. | Several days. (Weeks in winter.) | Alcoholic sodium hydroxide spray. |
| | Keep quiet and warm. Loosen clothing. Reassure. Spray nose with neo-synephrin or sniff bleaching powder. Aspirin for headache. | 10 minutes. | Bleaching powder solution. |
| | Remove to pure air, keep quiet. Sniff chlorine from bleaching powder bottle. | Summer 10 minutes. | Bleaching powder solution. |
| one needed. | Produces no effect requiring treatment. | While burning. | None needed. |
| | Wash with soda solution. | 5 to 10 minutes. | Alkaline solution. |
| one needed. | Produces no effect requiring treatment. | 10 minutes. | None needed. |
| one needed. | Pack in cloths wet with copper sulphate (blue vitriol) or water or immerse in water. Pick or squeeze out particles. Treat for burn. | 10 minutes. | Burns out. |
| one needed. | Treat for severe burn. | 5 minutes. | Quickly cover with earth or sand. |

KEY

SMOKE

INCENDIARY

MASK PROTECTION NEEDED

FULL PROTECTIVE CLOTHING NEEDED

FIRST AID TREATMENT

HOSPITAL CASE

# SPECIAL DUTY MANUAL FOR FIRE WATCHERS